ATOMIC ENERGY letter

THE FIRST AND ONLY ATOMIC [illegible] ADVISE

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Dear Sir:

A new site for the experimental detonation of nuclear explosives will be established by the U. S. Atomic Energy Commission on a portion of the 5,000 acre bombing and gunnery range at Las Vegas, Nevada, now used by the U. S. Air Forces. Operations chief of this test ground will be Dr. Alvin C. Graves, of Los Alamos Scientific Laboratory, who is the deputy commander of the Eniwetok Atoll nuclear weapon test force. He will have a staff of 300 under him at Las Vegas. This new facility will supplement the Salton Sea, Calif. weapons testing station. It also has excellent accessibility by highway to Sandia Base, N. M., one of the atomic weapons assembly areas, and to the various nuclear weapons storage points in the Sandia and Manzano mountains, in New Mexico. Immediate costs of the Las Vegas construction, under a contract negotiated by the USAEC with Robert W. McKee, Santa Fe contractor, were set at an initial $500,000.00. A peak expenditure of $5,000,000.00 was anticipated.

A new atomic pile will be constructed at Canada's Chalk River, Ontario, nuclear energy research center. Expected to cost approximately $30 million, actual construction may start late this Summer. Like the present NRX reactor at Chalk River, the new unit will be a heavy water moderated reactor. Canada will draw on its experience at NRX, which has the highest neutron flux density of any reactor in existence, and at the other of its two piles, the smaller ZEEP, which was the first such unit to operate outside the United States. The new reactor will provide plutonium for Canada, as well as facilities for studying fundamental factors involved in such problems as breeding nuclear fuel, and the development of power-producing piles. The high flux density of the new unit will also enable Canada to produce more radioisotopes, especially cobalt-60, which has proved of unique value in industrial radiography and nondestructive testing as an inexpensive substitute for radium. Trade Minister C. D. Howe said there is now a greater demand for this material than can at present be supplied.

Catalytic Construction Co., Phila., who have been awarded a $10 million contract by the USAEC for the design and engineering of a new uranium ore refinery, has named H. J. Monnik, the company's chief engineer, to be project director of its atomic energy division, according to T. Ellwood Webster, president of Catalytic. Special offices have now been set up in the Widener Bldg., Phila., to house this atomic energy division's work force.

Tennessee Valley Authority will start work this week on two new steam power plants--one near Paducah, Ky., and the other at Kingston, Tenn. A large part of the projected electrical capacity of the plants will be for atomic energy projects. Each of the two plants will have four generating units, with a capacity of 150,000 KW for each unit.

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AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

OAK RIDGE, Tennessee A-50¢ cut in its fee features the new 3½-year contract for Oak Ridge community operations, signed the first of this year by Roane-Anderson Co., and the USAEC. Roane-Anderson, subsidiary of Turner Construction Co., New York, has managed, operated and maintained community facilities here since the Fall of 1943. Under its old contract, it received an annual fee of over $180,000.00. By Congressional action, the statutory limitation on such fees at the U. S. "atomic cities" has now been placed at $90,000.00; this is the approximate fee that is now to be paid to Roane-Anderson.

Facilities for "Operation 10" are shortly to be constructed here; bids (inv. no. 401-51-13A, closing January 26th) have now been asked by the USAEC here. The work includes construction of a control house, which will be entirely of one-foot-thick concrete; a 51-foot diameter radiation slab, also of concrete, and other appurtenances.....Plans and specifications for the new laboratory building for K-25, to be erected at the gaseous diffusion plant here are now completed, and bids have been asked for the work (inv. no. 401-51-12A, closing February 12th). The work to be done is a two-story building, which will have a gross floor area of approximately 7,290 square feet, the utilities, and other site operations.....Another job projected for Oak Ridge--the High Voltage Laboratory building--has now been opened to bids (inv. no. 401-51-8A, closing February 8th). This building, which will include a basement and three floors, will have a gross floor area of approximately 34,260 square feet. (Priority ratings of DO-41 will apply to all these jobs.)

A new session at the Oak Ridge School of Reactor Technology--which trains engineers and scientists in the field of reactor theory and technology--is scheduled to begin here this September 10th. Students will be limited to those with bachelor or master degrees in chemistry, engineering, metallurgy, or physics. There will be both student-employees (who will be paid by Oak Ridge National Laboratory while attending), and trainees from other government agencies and industrial organizations (who presumably remain on the payrolls of their respective organizations). Additional information may be obtained from the School at P. O. Box P, Oak Ridge; all applications must be filed before March 1st, 1951.

At the current 4-week course now being given here at Oak Ridge in the techniques of using radioisotopes in research--which began last week--thirty-two persons from 16 States and Brazil are in attendance. They came from medical schools, universities, industrial laboratories, hospitals, clinics, and other government laboratories. Two additional courses are scheduled to start February 19th, and April 16th.

IONIZING RADIATION...investigations and notes...

The protective effect of the antibiotics streptomycin and penicillin on the mortality from internal radiation has been studied by S. Koletsky and J. H. Christies, Western Reserve School of Medicine, Cleveland, Ohio. The investigation was instigated because of the possibility that bacterial toxemia might play a role in radiation deaths, since rats dead of phosphorous-32 poisoning commonly show bacterial lesions at autopsy. In this work, it was found that streptomycin and penicillin, in combination, were effective in reducing the mortality of rats given lethal doses of radioactive phosphorous. Morbidity was also reduced, and survival time prolonged.

A series of experiments have been conducted by W. H. Chapman and E. P. Cronkite, of the Naval Medical Research Institute, Bethesda, Md., in which glutathione-injected and non-treated mice were irradiated and compared with respect to x-ray dosage-mortality, weight change, and the effect of controlled trauma on the surviving irradiated animals. (Previous work had shown the beneficial effect of glutathione and cysteine on the course of radiation illness.) In the present work, glutathione injections, prior to irradiation, were found to improve the survival rate, decrease the weight loss, and reduce the susceptibility to trauma of x-irradiated mice. Four mg. of glutathione per gram of mouse was found to be approximately twice as effective as 1.6 mg. glutathione per gram of mouse. The experiments showed no protection evident in the low lethal dose range of 450-650 r.

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

From The Manufacturers- Model 1061 linear amplifier adapts this manufacturer's Geiger-Muller scalers to proportional counting. The instrument is connected between the detector and scaler, and provides sensitivity adjustment, calibrated in millivolts, with a choice of 1 or 10 millivolt maximum sensitivity. The instrument has a flat frequency response of 10,000 cycles to 1.5 megacycles. A set of oscilloscope terminals are located on the front panel, while all other connections are on the rear. The instrument is so designed that the scaler may operate independently without disconnecting it from the amplifier.--Nuclear Instrument and Chemical Corp., Chicago 10, Ill.

Production model of its beta-gamma hand and foot checker, now made available to industrial plants, laboratories, and other areas where radioactive materials are stored or used. In operation, a person steps on the foot checker platform, placing his or her hands in the hand checker pockets. The system is automatically put into operation (by the weight of the body), and provides a beta-gamma count of the palm and back of each hand, as well as the feet. Stepping off the device automatically resets the registers for the next person. The scalers and power supplies are mounted on a hinged panel directly below the hand checker. The output of each of the four Geiger-Muller tubes in the hand checker is fed to a scale-of-eight scaler; that of the two Geiger-Muller tubes in the foot checker to a scale-of-sixteen.--The Austin Co., Special Devices Division, New York 6, N. Y.

"Versene", incorporated in non-irritating, non-toxic formulations, for radioactive decontamination of persons, or used with other bases for decontamination of surfaces or objects. The product Versene--sodium salt of ethylenediamine-tetraacetic acid--is an organic metal complexing agent which converts metals (such as radioactive dusts) to a form that can be easily rinsed away with water.--Bersworth Chemical Co., Framingham, Mass.

Experimental and Development Work- Because of the high efficiency of scintillation phosphors to the detection of gamma rays, their use in the measurement of iodine-131 thyroid uptake was investigated by W. J. Macintyre, Atomic Energy Medical Research Project, Western Reserve University School of Medicine, Cleveland. Five phosphors were studied: anthracene; naphthalene; naphthalene with anthracene activator; 0.1% thallium-activated potassium iodide; and dihydro anthracene. Scintillation counters using the five phosphors were compared over a five week period with a conventional Geiger counter. The increased sensitivity was found to be sufficient to allow an immediate reduction of the tracer dose from 100 micro-curies, to 50 micro-curies, with a subsequent reduction to 25 micro-curies. At the same time, a decided improvement over the Geiger counter in counting statistics was obtained.

In an investigation of beta-ray transmission by thin Nylon and Formvar films, used as windows, by R. B. Heller, and others, at St. Louis University, St. Louis, Mo., an effort was made to obtain experimental "absorption" correction to be used with Geiger-Muller counters employing such windows. It was found that window "absorption" included (1) energy loss of electrons traversing the films, and (2) scattering of incident electrons by the film (a geometry effect). Scattering of transmitted electrons was found to be a factor of considerable importance, whereas the energy lost in traversing the film was not very important for the range investigated. The electron energy range investigated was limited to the region in which the "absorption" correction was considerable for the window thickness used.

Further work on the application of the radioisotope tracer technique to metal cleaning has been done by J. C. Harris, and others, of Monsanto Chemical Co., Dayton, Ohio. Previously, they had used N,N-di-n-butyl stearamide as the radiotracer; however, it had proved extremely difficult to remove: this was attributed to chemisorption. In the most recent undertaking, they used an oil soluble tracer compound (n-Undecane, tagged with C-14) which is not chemisorbed, and compared results with the tracer previously used. It was found, using n-Undecane, that it was possible to successfully differentiate between types of cleaning compositions, and that the n-Undecane is adsorbed to a lesser extent than the previously used radiotracer.

ATOMIC PATENT DIGEST...latest U. S. applications & grants...

GRANTS- Method of determining the proportions of two substances in a mixture. This comprises transmitting a beam of gamma rays through a mixture when the proportions of the substances are known, subsequently transmitting the beam through an unknown mixture, and from a comparison of the measurements calculating the proportions of the substances in the unknown. U. S. Pat. No. 2,534,352, issued Dec. 19, 1950; assigned to The Texas Co., New York.

Preparation of compounds of uranium and non-metals. This process comprises reacting uranium hydride with the vapors of a compound of hydrogen and a non-metal selected from groups III, IV, V and VI, of the periodic table. U. S. Pat. No. 2,534,676, issued Dec. 19, 1950; assigned to United States of America (USAEC).

Process of preparing a uranium halide. This comprises reacting uranium hydride with a halogenating agent selected from the group consisting of elemental halogens, hydrogenated halides, carbonyl halides, and halogen substituted methanes. U. S. Pat. No. 2,534,677, issued Dec. 19, 1950; assigned to United States of America (USAEC).

An improvement in prospecting involving the detection of the intensity of gamma radiation from the earth. This involves interposing an additional detector, sensitive to cosmic rays, in the path of the cosmic rays (which are passing to the original detector used) and observing only those rays which are detected by this original detector unit. U. S. Pat. No. 2,535,066, issued Dec. 26, 1950; assigned to The Texas Company, New York.

Multiple coincidence circuit for receiving signals coincident in time and for producing a large single signal. U. S. Pat. No. 2,535,377, issued Dec. 26, 1950; assigned to United States of America (USAEC).

Preparation of uranium hexafluoride, by heating uranium hexafluoride with anhydrous oxygen at an elevated temperature. U. S. Pat. No.2,535,572, issued Dec. 26, 1950; assigned to United States of America (USAEC).

An electronic switch comprising an envelope containing an ionizable atmosphere, an anode, a trigger electrode, and a biacting electrode. U. S. Pat. No. 2,535,886, issued Dec. 26, 1950; assigned to United States of America (USAEC).

APPLICATIONS- Thermocouple anchor. Method of using bismuth metal to anchor a thermocouple in a graphite block in an atomic pile. App. No. 693,332; published Dec. 26, 1950. (H. W. Newson, inventor; assigned to United States of America-USAEC).

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear energy field...

Applied Nuclear Physics, by E. C. Pollard, Yale University and W. L. Davidson, B. F. Goodrich Co. A revision of the original text (1942) expanded to include progress in the field since then. Covers practically all phases of nuclear science including the basic facts of nuclear particles and radiations and methods of accelerating them, transmutation, natural and artificial radioactivity, isotopy, and nuclear fission. New additions (to the original 1942 edition) include an appendix on elementary pile theory; an additional chapter on nuclear chain reactions; and a section on nuclear diffraction. 352 pages.--John Wiley & Sons Co., New York ($5.00)

What is Atomic Energy, by K. Mendelssohn. A popular approach to the subject. 180 pages. -- Interscience Publishers, Inc., New York ($1.25).

Films on Atomic Energy; Suggested Outlines for Film Producers. An excellent series of outlines covering aspects of atomic energy sufficiently "popular" to have a broad appeal; educational in nature.--Council on Atomic Implications, Inc., Univ. of So. California, Los Angeles 7, Calif. ($1.00)

The Hell Bomb, by William L. Laurence. The hydrogen bomb and its implications "interpreted" in a manner diametrically opposed to the views of outstanding authorities, and with unwarranted optimism concerning its weapon potentialities. 198 pages. Alfred A. Knopf, New York. ($2.75)

Health Services and Special Weapons Defense. A comprehensive report on accomplishments in the United States. National Security Resources Board, Washington 25, D.C.

ATOMIC ENERGY WORK ABROAD...Great Britain...

The Graphite Low Energy Experimental Pile (GLEEP) at the Atomic Energy Research Establishment, Harwell, began operating in August, 1947; essential features of this reactor have now been revealed for the first time, with the adoption by the U.S., Britain and Canada of a revised Declassification Guide (AEN- 12/5/50, P. 2).

The GLEEP, a slow neutron reactor using graphite as a moderator and natural uranium and uranium dioxide as fissile material, was constructed to meet two main requirements: (1) To run at as high a power as possible, without elaborate cooling arrangements, so that radioisotopes could be produced until the larger (BEPO) Harwell pile became useable. (2) To compare slow neutron absorption cross-sections of the elements by the pile modulation method.

The pile is built in the form of a right octagonal prism of graphite lying on one of its sides. The reacting core is cylindrical, with the uranium rods lying horizontally in the form of a line lattice of pitch 7¼"; the reflector forms the remainder of the octagon, the lower corners of which are filled in with graphite introduced for constructional reasons only. Total quantity of graphite in the pile is 505 long tons. The graphite is stacked in forty layers, each layer being built with graphite blocks stacked in such a manner as to resemble a parquet floor.

The reacting core of the pile is loaded with 12 tons of uranium metal up to a radius of 1.75 meters, the outer region being loaded with 21 tons of uranium dioxide. The uranium metal is in the form of cylindrical bars 12" long by 0.9" diameter, and is sprayed with aluminum of 0.003" thickness to prevent the escape of recoil fission products.

Four cadmium rods, which move together, are used to maintain coarse control. One single rod is used as the fine control. All the control rods can be moved up and down by electric motors which are situated on the outside of the pile, and operated from the pile control room. In addition, there are two sets (each consisting of three rods) of emergency shut down rods. These cadmium rods are held out of the pile, when it is operating, by magnetic clutches. If the pile power rises above a pre-set level, a trip circuit cuts off current to the magnetic clutches, and the emergency rods fall into the pile under gravity.

An elementary ventilation system for the pile, capable of delivering 5,000 c.f.m. of air, is provided to remove active argon from the pile, and do some cooling of the uranium cartridges. The air is forced by a baffle to flow over the uranium cartridges, and is extracted by a suction fan on the top of the pile. Use of this cooling system enables the pile to be run at a power of 100 KW.

The power level of the pile is measured by six ionization chambers of 5 litres volume, containing boron trifluoride gas at a pressure of 20.7 cm. of mercury. Three of these chambers are used for pile control, and the other three are used to operate the emergency shut down mechanism. All the chambers have pre-amplifiers attached to them, the main amplifiers being in the pile control room. Initially, as the pile power is raised from zero, the resistor in series with a chamber is changed, so that the chamber measures all powers up to 1 KW without any change of position Above 1 KW, the chamber is wound out of the pile successively to two pre-set positions, in which the neutron fluxes are factors of 10 and 100 times lower than the flux at the original position. In this way, with only three positions for each chamber, six decades of pile power can be measured.

Rough temperature measurements are made at four points in the pile by means of resistance thermometers. Two of these thermometers are strapped on to uranium cartridges near the center of the pile; one is embedded in a uranium dioxide cartridge; and the remaining one is embedded in a graphite cylinder which has been lowered down one of the vertical experimental holes.

Sincerely,

The Staff,
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